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The Case for a National Broadband Policy

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Market forces alone will not generate the societally optimal level of broadband, at least for the foreseeable future.

It's hard to pick up a business or technology magazine without reading how the United States is falling behind in broadband telecommunications. After the requisite bemoaning of our low and falling rank, these articles usually close with a vague and ill-defined plea for policy makers to do more to accelerate broadband deployment and take-up.

What is all too often missing from the debate over broadband is a case for why public policy should focus on broadband. After all, a host of other cool digital technologies have been recently introduced, but there is no talk of an iPod gap or the need for a national Blu-Ray player strategy. But broadband is different in two key ways. First, it is a not just a consumer technology like the iPod or Blu-Ray player, it is "prosumer" technology that is enabling consumers to also be producers who contribute to economic growth and innovation. Second, it exhibits positive network externalities where the benefits from broadband adoption accrue not just to individual consumers, but to other broadband users and society as a whole. Because of this the social returns from investing in more broadband exceed the private returns of companies and consumers. As a result, market forces alone will not generate the societally optimal level of broadband, at least for the foreseeable future. In markets like this, public policies – in this case a proactive national broadband strategy – are needed to maximize overall societal welfare.

This paper makes the case for proactive public policy support of broadband telecommunications. It first examines whether the United States has fallen behind in broadband. It then discusses four reasons why leaving it to the market alone is likely to lead to slower deployment and take-up of broadband, especially next generation, high-speed broadband: 1) network externalities; 2) "prosumer" investment externalities; 3) competitiveness externalities; and 4) regional externalities.

Is the United States Behind in Broadband?

The issue of net neutrality is not the only contentious issue related to broadband policy. The relative state of broadband deployment in the United States has become almost as contentious. Various international rankings of broadband adoption show the United States falling behind. According to the latest OECD numbers, we rank 15th among 30 OECD nations in subscribers per-capita, down from 4th in 2000.[1] Using a broader measure of share of the households subscribing to broadband, average broadband speed, and broadband prices, the United States ranks only slightly better, at 12th.[2] (see Table 1) For example, Iceland's broadband subscription rate is more than 50 percent greater than that of the United States. South Koreans pay nine times less per megabit of speed than do Americans. And average speeds in Japan are 20 times faster than in the United States.

A first step in determining whether we need a proactive national broadband policy is to assess our rank. The low and falling rank of the United States suggests to many that we need proactive policies. To be sure, if we were leading in broadband, many of the policies recommended here would still be valid and important. But the fact that we are lagging behind adds urgency to the broadband policy debate.

Yet those who oppose such a proactive policy try to minimize the gap and the importance of rankings. Scott Cleland, head of Netcompetition.org, asks what's wrong, given that after all, "America has more broadband connections than any other nation."[3] But by this logic even if every home in Iceland (a current leader in broadband take-up) subscribed to broadband, they would still be behind us because their 1.6 million connections would be dwarfed by our 56.5 million. Progress and Freedom Foundation scholar Scott Wallsten points to the fact that, "The share of the Americans who are Internet users, for example, compares much more favorably with the rest of the world and is higher than those of other countries often held up as models to be emulated, such as Japan."[4] While our rank on the share of population online may be higher than our rank on broadband, this is because we have more users on slow dial-up connections (because many other nations charged dial-up users by the minute, more switched to flat-priced broadband.) In fact, the same proportion of Japanese households subscribe to broadband as do U.S. households, and at speeds that are 20 to 100 times faster.

Others dismiss the very idea of comparing us against other nations, citing factors, like differential population density, that they claim excuse our lagging performance. Certainly, it is less costly to deploy broadband to urban apartment buildings in Seoul than to rural towns in Wyoming. The problem with this argument is that the majority of Americans do not live in rural towns in Wyoming. Most live in urban areas. Using a measure of "urbanicity" that takes into account both the percentage living in urban areas and the average density of those areas, there is virtually no correlation between a country's "urbanicity" and its level of broadband adoption.[5] In other words, OECD countries with more dense urban populations do not necessarily have higher levels of broadband take-up.

When push comes to shove, apologists for our low and declining rank fall back on one core argument: there is no right amount of broadband, only the amount provided by the market. In other words, these market-oriented conservatives ask what right does someone have to say that the amount of broadband sold in the United States is too limited? It's a matter of faith for them that

Table 1: ITIF Broadband Rankings[6]

Rank	Nation	Penetration	Speed	Price	Overall Score
		Subscribers per Household	Average Speed (mbps)	Price per Month for 1 mbps of Fastest Technology (USD PPP)	
1	Korea	0.90	45.6	0.45	15.73
2	Japan	0.52	61.0	0.27	14.99
3	Iceland	0.83	6.0	4.99	12.14
4	Finland	0.57	21.7	2.77	12.11
5	Netherlands	0.73	8.8	4.31	11.87
6	Sweden	0.49	18.2	0.63	11.54
7	France	0.49	17.6	1.64	11.41
8	Denmark	0.70	4.6	4.92	11.37
9	Norway	0.64	7.4	4.04	11.29
10	Canada	0.62	7.6	6.50	11.11
11	Belgium	0.54	6.2	6.69	10.60
12	United States	0.51	4.8	3.33	10.47
13	Switzerland	0.68	2.3	21.71	10.40
14	Australia	0.50	1.7	2.39	10.23
15	Austria	0.42	7.3	5.99	10.08
16	Portugal	0.42	8.1	10.99	9.92
17	United Kingdom	0.50	2.6	11.02	9.92
18	Germany	0.38	6.0	5.20	9.81
19	Italy	0.38	4.2	3.36	9.78
20	Luxembourg	0.51	3.1	18.48	9.71
21	Spain	0.44	1.2	12.46	9.48
22	New Zealand	0.36	2.3	9.20	9.26
23	Ireland	0.37	2.2	13.82	9.14
24	Poland	0.20	7.5	13.00	8.69
25	Czech Republic	0.27	1.6	24.10	8.11
26	Hungary	0.30	3.0	44.24	7.53
27	Greece	0.12	1.0	33.19	6.93
28	Slovak Republic	0.16	2.8	50.15	6.58
29	Mexico	0.16	1.1	60.01	6.00
30	Turkey	0.17	2.0	115.76	3.81
Average		**0.46**	**9.0**	**16.52**	**10.00**

the amount of whatever product or service American firms are selling and American consumers are buying is the right amount because this level is set by infallible market processes. If other nations have more broadband it must be either because their consumers want more or because their governments have intervened to generate excessive broadband.

Imagine this debate taking place in the 1930s with some analysts arguing that the United States had the right amount of electrical connections and that any efforts to accelerate near universal access to electricity was not only not needed, but downright harmful. At the time although nearly 90 percent of urban dwellers had electricity, only ten percent of rural dwellers did and private electric utilities were wary of making the investments. But the Rural Electric Administration was established to not only establish rural electric cooperatives but also to help private utilities extend service. Just like wiring the nation for electricity 70 years ago underpinned a host of other positive developments (e.g., boosting farm productivity); accelerated widespread adoption of high-speed broadband will do the same today.

Broadband exhibits positive network externalities where the benefits from broadband adoption accrue not just to individual consumers, but to other broadband users and society as a whole.

Luckily those voices either weren't speaking or weren't listened to, and policy makers worked to help bring electricity and telephony to virtually every household in America.

Since We Are Behind, Should We Take Positive Steps to Catch Up?

Those wishing to paint a rosier picture of America's broadband position have one central motivation for doing so: acknowledging that we don't have "enough" broadband opens the door for government policies to spur broadband deployment and adoption. If we lag behind, and if that matters, then the market must not be performing adequately and therefore government may need to do more. For many market-oriented conservatives this violates a core tenet: that government should be limited. For example, Scott Cleland seeks to portray our rank in positive light because he is worried that otherwise, our poor performance will embolden proponents of net neutrality legislation.[7] Yet, while there are many arguments offered for net neutrality legislation, boosting our broadband rankings is not normally one of them.[8] Others worry that our poor ranking will lead to calls for price regulation. But again, there it's hard to fathom a link between price regulation and more broadband.

Still others fear that our falling rank will be seen as a repudiation of the U.S. broadband regulatory strategy of favoring inter-platform competition (letting cable and telephone companies slug it out in the broadband marketplace). Other nations, including most of the OECD leaders, chose intra-platform competition (requiring the incumbent telephone monopolies to share their lines with other broadband ISPs). But the OECD numbers do not necessarily reflect that line sharing is responsible for the success of some nations. Lacking robust competition from cable companies, those nations chose their approach largely because they knew that if they wanted to "generate" competition, forcing the incumbent to share its lines was the only way. In contrast, in the United States, cable companies were in the marketplace first and it is the incumbent Bells that have had to struggle to catch up. Moreover, while some leading countries in Europe and Asia embraced line sharing, so too have many of the lagging ones.

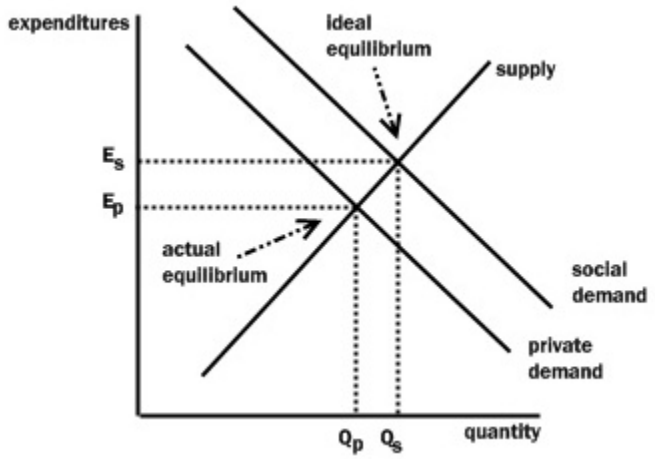
Others just generally worry that any government action will be bad. Former FCC Commissioner Harold Furchtgott-Roth argues not only that we don't need a national policy for broadband, but that such a proactive policy "would be bad for broadband."[9] At the core of their arguments against a national broadband policy is the belief that broadband is like other products and services that the market does a perfectly adequate job of producing and allocating. For them, broadband is no different than other consumer technologies like MP3 players and DVD players. Because broadband is seen as essentially a consumer technology, it's best to leave it alone, reduce government barriers, and let the "market" allocate it.

But high-speed broadband is different in two important ways from MP3 and DVD players and other consumer devices. First, as we transition to a digital society where many aspects of life will be conducted online, widespread access to broadband is becoming a central factor in ensuring opportunity for all Americans. Whether not all Americans have a digital music or media player is not a legitimate matter of public policy concern. Whether or not all Americans have access to a key enabling technology like broadband is. To the extent that some Americans cannot afford broadband access or cannot subscribe to it, there is an equity argument that can be made for a government role to ensure widespread adoption. To date, broadband has been deployed unevenly, with lower cost, higher income areas getting it first. Given that broadband is largely provided by private companies with limited capital budgets, such deployment patterns make sense. However, this does not mean that government should not do more to spur deployment and take-up in high-cost areas or by low-income individuals.

Second, and just as important, there are significant positive externalities from broadband adoption. The notion of externalities is quite simple: it is a divergence between private and social cost (or benefit). Externalities occur when one market participant's action affects others without compensation being paid or received.[10] In a competitive equilibrium with the presence of costs (or benefits) that do not accrue to the individual economic actor, competitive markets alone will not achieve an optimal outcome (what economists call Pareto optimality). The classic case of an externality is pollution: a company's smoke imposes costs on its neighbors that are not paid for. In the absence of regulation or some other mechanism of forcing the company to bear the costs imposed on the neighbors, overall social welfare will be less. Externalities can also be positive. For example, when a company conducts scientific research some of the benefits usually accrue to others. Because the benefits of research spill over, most governments have instituted some kind of tax incentive that rewards companies for doing more R&D so that they will do more of it.[11]

The presence of positive externalities often means that absent some public intervention that there will be less of an activity or product than is economically optimal. To see why consider Figure 1. If consumers only take into account their own private benefits from subscribing to broadband, the market will end up at expenditure Ep and quantity Qp. However, if there are positive externalities where the benefits spill over beyond users then the net social demand curve shifts to the right. The supply of broadband should then be increased until the marginal social benefit equals the marginal social cost. In this case, the societally optimal supply of broadband is at expenditure Es and quantity Qs. Absent proactive public policies, the market will undersupply broadband at Qp, instead of the more efficient Qs. (see Figure 1)

Figure 1: Supply and Demand for Broadband with Positive Externalities



The issue of broadband externalities goes to the heart of the debate over whether the United States should have an explicit national broadband policy. If there are few broadband externalities then it is likely that the market is supplying the "right" amount of broadband and that the proper role of government is to simply reduce regulatory barriers to deployment, and perhaps ensure more equitable access (e.g., by helping spur deployment and take-up in high-cost areas and by low-income individuals). This position is based on the view that externalities from greater deployment of fast broadband are indeed minimal and that proactive policies would only distort "allocation efficiencies." Indeed, for those opposed to proactive broadband policies, the risk is that government policies could produce too much broadband by making broadband artificially cheaper than it otherwise would be.

There is considerable reason to believe that there are in fact significant positive externalities from high-speed broadband and that left to themselves, market forces alone will lead to less investment in broadband than is societally optimal. There are four kinds of broadband externalities: 1) network externalities; 2) "prosumer" invest-ment externalities; 3) competitiveness externalities; and 4) regional externalities.

1) Network Externalities

Broadband exhibits several kinds of positive externalities, but perhaps the most important are network externalities. Network externalities are the effects on a user of a product or service of others using the same or compatible products or services. Positive network externalities exist if the benefits are an increasing function of the number of other users. In this case a good becomes more valuable to individual consumers as others also purchase that good. The classic example is telephone service which becomes more valuable to a user if more people are connected. Indeed, telephone network externalities have long been recognized and have been a major rationale behind universal service policies. But broadband externalities are likely to be even more significant, in part because broadband will enable new services to emerge that will benefit broadband users.

There are two kinds of network externalities from broadband, direct and indirect. Direct externalities relate to subscribership. Just as the fax system became more valuable when more people had faxes, broadband becomes more valuable when more people have

broadband. Moreover, the more people have broadband, the more likely others are to subscribe. This is in part because the decision to purchase broadband is dependent in part of sufficient knowledge about it. Unlike a service like haircuts or a product like TVs that most people are familiar with and can accurately value, fewer people are familiar with broadband and cannot always value their benefits. Empirical evidence suggests that this is a factor that affects subscribership. Goolsbee and Klenow found that people are more likely to buy their first computer if they live in areas where a high proportion of households own computers or if a high fraction of their friends and family own computers – even controlling for other factors affecting computer ownership. If ownership rates are 10 percent higher in one city than another in a given year, the gap will be 11 percent the following year, assuming all else stays constant.[12] They explain this effect on the basis that the number of experienced and intensive computer users creates a "spillover" effect for non-users. They conclude that the effect is most probably related to the use of e-mail and the Internet – consistent with the view of computers being the hub of an information and communications network. But it is also likely to be related to the fact that people who have friends and neighbors with broadband are more likely to be able to better understand its value. While dial-up connections also enable network externalities for applications like email, only broadband would generate them for more bandwidth intensive applications like sharing of digital photos and video telephony.

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Indirect network externalities from broadband relate to its effect on applications and content that requires broadband transport to work effectively. One reason why broadband take-up is not higher is because data-rich applications that could be accessed over broadband have not developed faster. Why develop a high bandwidth-intensive Web application like downloadable TV shows or tele-medicine when very few people would be able to access them at the needed speeds? For example, it is only in the last year that YouTube has taken off because it was only then that there have been enough broadband users to make the business model viable. This "chicken-or-egg" issue slows deployment of high-speed broadband. More data-intensive applications would make high-speed broadband more valuable, while more high-speed broadband subscribers would make data-intensive applications more commercially viable. Indeed, more high-speed broadband would spur the development of a whole host of new applications that are not viable now in a low speed world. While some of these we can imagine (e.g., Internet-based "TV", video telephony and applications like tele-medicine) others surely will burst onto the scene as the "next new things."

"Prosumer" Externalities

The second major kind of broadband externality relates to the fact that broadband enables consumers to become more efficient, thus in turn driving higher rates of productivity and economic growth. In the old economy producers produced and consumers consumed. Producers invested in new capital equipment to produce goods and services more efficiently and consumers in turn bought these cheaper goods and services. This dichotomy between producers and consumers is blurring in the new digital economy where a whole host of digital tools are enabling consumers to become, in the words of futurist Alvin Toffler, "prosumers" who act at the same

time as both consumer and producer.[13] Whether it's using a self-serve checkout line at a grocery store, filling out and submitting a form online, using an airport kiosk to print a boarding pass, or paying a toll with EZ-Pass, self-service is becoming an important share of the economy, helping to boost productivity and increase consumer convenience. Indeed, with the service sector now accounting for over 80 percent of employment, prosumerism will simply have to play a much larger role if we are continue to boost incomes and economic growth.

Broadband promises to be a key technology for boosting prosumer productivity. Broadband is dramatically reducing the costs of distributing digital content, for example, by substituting the transport of atoms in DVDs with the cheaper transport of bits in downloaded movies. Broadband is reducing travel, by enabling applications like tele-medicine and tele-work. Broadband is reducing a whole host of transaction costs by making it easier to conduct business and commerce online.

For example, deployment of high-speed broadband is likely to enable greater use of tele-medicine, thus not only improving health care outcomes but potentially lowering overall health care costs. Tele-care and related assistive technologies can enable older and disabled people to remain in their own homes – rather than in hospitals or residential care – saving money and reducing demand for residential care space.[14] Robert Litan finds that expanded broadband deployment among seniors and persons with disabilities will result in cumulative savings and output gains of at least $927 billion by 2030.[15] Broadband, according to Litan, can deliver these benefits in three ways: by directly lowering health care costs, by postponing or obviating the need for institutionalized care, and by enabling increased workforce participation. But the benefits are not merely economic. Broadband applications such as home health monitoring can allow millions of people to live more active and fulfilling lives. One study of a tele-medicine program for rural children with special health needs found that it afforded them similar high quality care without the cost or inconvenience of driving several hours to see specialists face to face.[16]

But such social benefits are not confined to health care. They include a host of other areas. For example, deployment of high-speed broadband is likely to increase telecommuting by workers. While workers receive most of that benefit (in the form of reduced travel time) society also benefits in at least two ways. First, to the extent that travelers do not pay the full social cost of traveling (both transit and auto users are subsidized and both impose costs on society in the form of increased pollution, although transit users are more heavily subsidized than drivers, while drivers impose more costs through pollution and other externalities), reduced travel boosts societal welfare. And the decrease in travel is substantial, with corresponding reductions in congestion, pollution and oil consumption. One survey of the literature concludes that telecommuters drive 53 to 77 percent less on days they telecommute than they would otherwise.[17] While about 2 percent of the workforce currently telecommutes on any given day of the week, the promise of broadband is that – by making a broader spectrum of applications available to those who choose to work remotely – many more people can work from home more often.[18]

To the extent that telecommuting boosts worker productivity, society benefits as the increases in productivity are translated into lower prices. At this point, much of the telecommuting productivity evidence is anecdotal or from self-reported data, but there are good reasons to believe that telecommuting does let people in many jobs work more productively.[19] For one, many people report that they can get more done with fewer interruptions at home. For

another, telecommuting allows employees to work when personal or family needs might otherwise force them to be absent from the office.[20] Finally, telecommuting frees employees from, on average, almost an hour of commuting each day. If any of this time is put towards working, it translates into greater output. For example, by relying on IT (*e.g.*, broadband, mobile e-mail and voice, etc.) the retailer Best Buy was able to give a large share of its corporate headquarters employees the option of more flexible working hours, including working at home. As a result, productivity has increased by 35 percent in departments that have implemented the program.

More and more employees are "going Bedouin," with 40 percent of all employees not in the office on any given day.[21] Indeed, telecommuting growth is much faster than the growth of the workforce.[22] Taken together, these factors make it reasonable to expect that telecommuting can make some workers more productive, yielding benefits for society. Telecommuting does not only make existing workers more productive, it also enables more people to join in the workforce. Parents staying home to raise young children, for example, could have the opportunity to work flexible hours from home rather than sacrificing their income altogether. A significant share of airline Jet Blue's reservation agents works from home, using a personal computer and broadband telecommunications connections.

Likewise, deployment of high-speed broadband is likely to spur distance learning, making it easier for more people to engage in more online learning, the benefits of which spill over to society as a whole. Indeed, distance learning powerfully expands educational opportunities, both for existing students and for those who may be unable to physically attend an educational institution (because they are employed, have children, or live in a rural area, etc.). Research suggests that postsecondary students taking advantage of distance education are far more likely to be employed full time and taking classes part time than other students.[23] Distance education also expands the course catalogue for traditional students, giving high school students, for example, access to AP courses not offered at their local school. Moreover, the evidence suggests that individual learners do not capture all the benefits of their investments in their own human capital, some of which accrues to society in the form of faster economic growth.[24] This is another way in which more high-speed broadband take-up would lead to externalities.

Broadband would also spur the growth of more efficient e-commerce and e-government. For example, in Korea, the world broadband leader, over 60 percent of stock trades are online, and Internet banking has grown dramatically.

The deployment of high-speed broadband will make it easier for people to do work. For example, broadband makes online volunteering even easier as it enables high quality two-way video. For example, the city of Fort Wayne, Indiana, where Verizon has deployed extensive fiber optic broadband, has set up a system where retired nurses help provide health evaluations for low- income residents without health insurance through means of two-way broadband connections.[25]

IT can help older Americans participate economically, in part by making it easier to work from home. In fact, the ability to work at home connected by broadband networks will enable the elderly to be more productive later into life. Litan estimates that allowing the elderly to work more at home through accelerated deployment of broadband telecommunications would boost economic output by between $114 and $228 billion.[26]

Many of these kinds of "prosumer" cost savings accrue to consumers. For example, Brookings scholar Robert Crandall

estimated that universal broadband adoption could yield annual consumer benefits of $300 billion. However, the benefits from broadband don't just accrue to the individual broadband prosumers; they spill over to society as a whole. The reason is that broadband is not principally a consumer service, like, for example, cable TV is. Rather, it is more like a capital investment, more akin to a technology like a server or computer system for a company.

This is an important distinction because if broadband is principally a consumer item – that lets people play games and watch video, for example – it is unlikely to have a large economic impact. On the other hand if it's more like a producer item – or in this case "prosumer" capital equipment, it's likely to have a larger economic impact. Indeed, there is evidence that investment in new capital equipment often produces total benefits that exceed the benefits the companies making investments receive.[27] Left to its own, the market will lead to an under-investment in new capital equipment (including machines, computers, and software). One reason for this is that investment followers benefit from the learning that investment leaders have done. De Long has found that investment in equipment "appears to yield social benefits to the economy in terms of higher productivity that dwarf the profits that owners of the capital goods installed are able to privately appropriate."[28] These externalities appear even higher for IT goods and services such as broadband. One reason is that IT seems to be "super capital" that has much larger impacts on productivity than other forms of capital equipment.[29] In part this is because IT transforms organizations and leads to innovations within other organizations, leading to high positive spillovers that may be taken advantage of by other organizations. Broadband is likely to have similar impacts.

Competitiveness Externalities

Broadband can help maintain U.S. IT industry competitiveness. Leadership in broadband is important for maintaining high standards of living and national competitiveness for two main reasons. First, having leading-edge technology buyers (both businesses and individuals) can help IT companies gain competitive advantage and boost IT jobs domestically. As Michael Porter wrote in *The Competitive Advantage of Nations*, "A nation's firms gain competitive advantage if domestic buyers are among the world's most sophisticated and demanding buyers for a product or service."[30] Sophisticated IT buyers appear to play a particularly important role. As The World Economic Forum notes, "IT readiness, and other factors related to national endogenous potential for innovation … are believed to be important drivers of any country's competitiveness, they become central for nations and companies that, for their stage of development, need efficient production processes and innovation to compete.[31]

There are signs that nations leading in broadband are translating that lead into increased competitive advantage for domestic IT companies.

There are signs that nations leading in broadband are translating that lead into increased competitive advantage for domestic IT companies. For example the speed and ubiquity of broadband in Korea has made it a test-bed for the next generation of Internet-based services and products, including online games, educational software, and consumer electronics. Because they were a key supplier of Korea Telecom, for instance, Samsung has become a world leader in the DSLAM market (technology for broadband over telephone lines). Likewise, Korea is home to some of

the leading online game companies, with over 50 percent of the online games sold in China coming from Korea. By 2010, Ncsoft, the leading Korean game maker, expects that over 70 percent of its revenue will come from exports.[32]

Countries at the IT leading edge are more likely to experience more of these kinds of benefits than are laggards. We have seen this in the U.S. telecom markets. In the 1990s telecommunications equipment makers in the United States were riding high. But with the collapse of the telecom market in the late 1990s and into this decade, the mantle of sector leadership has shifted overseas where telecommunications demand has grown much more quickly. As a result, our trade deficit in telecommunications products has grown to $27 billion dollars, as the share of the world's telecommunications products produced in the United States dropped from 40 percent in 2000 to 21 percent in 2004.[33] In contrast, there is anecdotal evidence that the recent increase in the deployment of fiber optic broadband in the United States is helping U.S. telecom equipment companies expand domestic employment. For example, Corning, the leading U.S. provider of optical fiber, has recently reopened its shuttered North Carolina fiber optic factory because of the increased deployment of fiber optic broadband. Companies like Motorola and Tellabs are likely to expand U.S. employment as telecom companies switch to GPON fiber networks (a more efficient technology architecture for fiber).

Regional Externalities

Regional economists have long recognized that there are significant externalities from the location decisions individuals and companies make. If an individual or a company moves to a metropolitan region that is crowded and expensive (e.g., with high housing costs and traffic congestion), they add to those costs in the region. This is one reason many regional planners and economists advocate balanced growth strategies, where efforts are made to help less crowded and expensive places to grow faster, thereby lowering relative growth rates in crowded, high-cost metropolitan areas. Siphoning off some growth from large, congested sprawling metros to smaller places will reduce congestion and costs in the former. Ensuring that these latter places have robust broadband is an important component of any national balanced growth strategy. While broadband can't create competitive advantage for a region, lack of it can retard it. For example, between 1998 and 2002 employment in communities with broadband grew 1 percentage point faster annually than communities without.[34] This means that a community with 50,000 jobs with broadband would have added 500 more jobs over four years than a similar community without broadband.

This happens in at least two ways. First, broadband has become a critical tool in business location and expansion decisions. While the presence of high speed and affordable broadband, particularly for business, is not a determining factor in business location decisions, the lack of it is. Second, broadband boosts the quality of life in rural communities, making it easier for them to attract and retain residents. Broadband, and the applications that it enables, is giving all Americans more choice, but it's a special boon to the 60 million Americans who do not live in large metropolitan areas. One of the advantages of living in a place like New York City was that because the city was so big, specialty stores of every imaginable type could find enough customers to thrive. This was fine as long as you lived in New York, but if you didn't you were out of luck. Broadband gives companies a potential customer base 20 to 30 times larger than those stores in New York. As a result, consumers who live in smaller metropolitan areas or rural areas and who were constricted in their choice of

products and services, now have the same kinds of consumer options as someone living in Manhattan. A rancher in the middle of Wyoming has the same selection of music and books through iTunes and Amazon as anyone in New York. Even the services once thought to be non-traded, or impossible to export beyond the immediate market, such as doctor appointments and college education, are increasingly traded through IT so as to reach remote areas. Many schools have created online courses, while others, like MIT, have posted course materials online. Tele-medicine can give rural patients the same access to care as the patient living in a major metropolitan area.

Conclusion

Broadband has become a "motherhood and apple pie" issue; no one is against more of it. But the real issue is not whether broadband is good and more is better, but whether the market alone will provide the right amount of it. What is the right amount? For most market-oriented conservatives it's the amount the "market" provides. Yet, because of significant positive externalities from broadband the right amount – the amount that maximizes social welfare – appears in fact to be greater than the amount the "market" alone provides. This means that active public policies to spur broadband, in addition to policies to remove barriers to deployment, are critical to ensuring the right broadband future for America. While it's true that proactive policies and incentives for more broadband might "distort" the market, it is also true that the innovation and productivity spurred by more and faster broadband is likely to vastly exceed any minor losses from "misallocation" of economic resources.[35]

What exactly those proactive public policies should be need to be subject to significant analysis, debate and consideration. However, at their core, **policies should focus on stimulating both the supply and the demand for high-speed broadband**.

Supply-side policies include:

- more favorable tax policies to spur investment in next generation broadband networks;[36]
- policies that ensure that there is significantly more spectrum available for next generation wireless data applications;
- support for research and development related to advanced networking technologies, such as Internet2[37];
- removal of regulatory barriers to deployment;
- targeted direct funding for deployment in some high-cost areas;
- better broadband data collection;[38] and
- funding for state and regional programs to help spur deployment, in part through activities like broadband mapping and demand aggregation programs.[39]

Demand-side policies include:

- eliminating taxes on broadband and Internet service[40];
- targeted and reformed universal service support for advanced broadband[41];
- support for public TV and libraries to put more content online;[42]
- spurring the next phase of e-government;[43]
- fostering applications like tele-work, tele-medicine, and e-learning;
- encouraging digital literacy for all Americans;[44]
- ensuring that policies do not discriminate against Internet radio.[45]

It's time to move beyond the debate of whether we need a national broadband policy. We do. The task now is to craft it and implement it.

Endnotes

1. A more accurate measure would also include broadband availability, in addition to broadband take-up. It is possible that one reason the U.S. lags behind is because more Americans choose not to subscribe, even though they could.

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19. For a review of telework productivity literature, see Ralph D. Westfall, "Does Telecommuting *Really* Increase Productivity?" *Communications of the ACM* 47.8 (Aug. 2004).

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36. Top ranking nations have relied in part on tax incentives to spur the deployment of their advanced telecommunications infrastructures. For example, Japan and Korea have allowed providers to write off the cost of building their high-capacity fiber networks.

37. For example, Internet2 is a consortium led by universities working in partnership with industry and government to develop and deploy advanced network applications and technologies.

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39. See ConnectKentucky: <www.connectkentucky.org>. Senator Dick Durbin (D-IL) has introduced the Connected Nation Act of 2007 (S. 1190), which would provide matching grants for state-level public-private partnerships like ConnectKentucky that evaluate and map broadband availability, and aggregate demand to spur deployment.

40. See Daniel Castro, "Internet Radio and Copyright Royalties: Reforming a Broken System," (Washington, D.C.: Information Technology and Innovation Foundation, 2007): <www.itif.org/files/InternetRadio.pdf>.

41. If broadband is to receive explicit universal service support it should be part of an overall reform of USF policies to ensure that policies are more targeted and efficient. For a discussion of USF policies toward broadband see Communication Workers of America, "Speed Matters: Affordable High-Speed Internet for All," (Oct. 2006): <files.cwa-union.org/speedmatters/SpeedMattersCWAPositionPaper.pdf>; and Alliance for Public Technology, "Achieving Universal Broadband: Policies for Stimulating Deployment and Demand," (2007): <www.apt.org/publications/reports-studies/Final-Report-Feb2007.pdf>.

42. For example, all PBS television shows could be Web-cast so that viewers could download them whenever they want. Likewise, the Library of Congress could take the lead in creating a National Digital Lending Library in partnership with local libraries so that Americans could "borrow" digital e-books.

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44. Some companies, like Microsoft, have taken significant steps to help build digital literacy, and some organizations, like One Economy, have taken steps to encourage digital adoption, but government needs to do more in partnership with the for-profit and non-profit sectors.

45. Daniel Castro, op. cit.

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